

What is claimed is:

1. A method for managing a network having a plurality of nodes and a connection failure along a first connection path, between a first node and a second node, the method

5 including the steps of:

determining whether a first connection can be established between the first node and the second node;

if the first connection cannot be established, determining whether a second connection can be established between the first node and a third node located after the

10 second node along the first connection path;

if the first connection and the second connection cannot be established, determining whether a third connection can be established between a fourth node located before the first node along the first connection path and the second node; and

15 if the first connection and the second connection and the third connection cannot be established, determining whether a fourth connection can be established between the fourth node located before the first node along the first connection path and the third node.

2. The method of claim 1, wherein the third node is immediately after the first
20 node, and if the first connection and the second connection cannot be established, the fourth node is immediately before the first node.

3. The method of claim 1, wherein each of the determining steps attempts to determine only non-retracing connections.

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4. The method of claim 3, further comprising the steps of:
- establishing a second connection path including one of the group of the first connection, the second connection, the third connection and the fourth connection;
- propagating path information corresponding to the second connection path for a
- 5 plurality of nodes in the network related to the second connection path.
5. The method of claim 4, wherein each of the determining steps attempts to determine only non-retracing connections.
- 10 6. A method for managing a network having a N-hop connection C from a node N0 to a node Nn and a connection failure between a node Nk and a node Nk+1, where $0 \leq k < n$, the method including the steps of:
- determining if a first connection can be established between the node Nk and the node Nk+1;
- 15 if the first connection cannot be established, determining whether a second connection can be established between the node Nk and a node Nk+i, where i is incremented from 1 to n - k until a determination that the second connection can be established; and
- if the first connection and the second connection cannot be established,
- 20 determining whether a third connection can be established between a node Nk-j and the node Nk+i, where j is incremented from 1 to k and for every j, i is incremented from 1 to n - k, until a determination that the third connection can be established.
7. The method of claim 6, wherein each of the determining steps attempts to
- 25 determine only non-retracing connections.

8. The method of claim 7, further comprising the steps of:

if the first connection can be established, restoring the connection C by

establishing a connection between the node N_k and the node N_{k+1} ;

if the first connection cannot be established and a second connection can be

5 established, restoring the connection C by establishing a connection between the node

N_k and the node N_{k+i^*} , where i^* is equal to i when the second connection can be

established during the step of determining whether a second connection can be

established; and

if the first connection and the second connection cannot be established and a

10 third connection can be established, restoring the connection C by establishing a

connection between the node N_{k-j^*} and the node N_{k+i^*} , where i^* is equal to i and j^* is

equal to j when the third connection can be established during the step of determining

whether a third connection can be established.

15 9. The method of claim 8, wherein each of the determining steps attempts to
determine only non-retracing connections.

10. The method of claim 8, further comprising the step of propagating path
information corresponding to the connection C to nodes in the network related to the

20 connection C.

11. The method of claim 10, wherein each of the determining steps attempts to
determine only non-retracing connections.

12. An apparatus for management of a network, comprising:
a processor adapted to perform the method of claim 1;
a memory in communication with the processor and adapted to retain
information relating to path information of a plurality of nodes;

5 a network interface in communication with the processor and capable of
communication with the network.

13. The apparatus of claim 12 wherein the memory is remotely located from the
processor.

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14. An apparatus for management of a network, comprising:
a processor adapted to perform the method of claim 3;
a memory in communication with the processor and adapted to retain
information relating to path information of a plurality of nodes;

15 a network interface in communication with the processor and capable of
communication with the network.

15. The apparatus of claim 14 wherein the memory is remotely located from the
processor.

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16. The apparatus of claim 14 wherein the apparatus is provided at each node of the
network.

17. An apparatus for management of a network, comprising:

25 a processor adapted to perform the method of claim 6;

a memory in communication with the processor and adapted to retain
information relating to path information of a plurality of nodes;

a network interface in communication with the processor and capable of
communication with the network.

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18. The apparatus of claim 17 wherein the memory is remotely located from the
processor.

19. An apparatus for management of a network, comprising:

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a processor adapted to perform the method of claim 7;

a memory in communication with the processor and adapted to retain
information relating to path information of a plurality of nodes;

a network interface in communication with the processor and capable of
communication with the network.

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20. The apparatus of claim 19 wherein the memory is remotely located from the
processor.

21. The apparatus of claim 19 wherein the apparatus is provided at each node of the

20 network.